WHAT IS CLAIMED IS:

1. An apparatus to determine the proximity of a dental instrument in a tooth's root canal to the canal's apical foramen while using the dental instrument to perform a dental/medical procedure, the apparatus comprising:

a signal generator operable to generate a divider signal;

a microprocessor operable to sense a stimulation signal derived from the divider signal and modified by a patient's impedance while operating the dental instrument to perform a dental/medical procedure, and operable to sample and demodulate the stimulation signal from noise generated while operating the dental instrument to perform the dental/medical procedure.

2. The apparatus of claim 1, wherein the dental instrument includes a tip, and the proximity indication includes proximity of the tip to the apical foramen.

3. The apparatus of claim 1, wherein the apparatus operating the dental instrument is a component of a handpiece.

4. The apparatus of claim 1, wherein the microprocessor is operable to compare the divider and the stimulation signal, and generate a proximity signal in response to the comparison from a correlation parameter that includes a lookup table.

5. The apparatus of claim 1, wherein the microprocessor is operable to compare the divider and the stimulation signal, and generate a proximity signal in response to the comparison from a correlation parameter that includes an equation.

6. The apparatus of claim 1, further including an analog-to-digital converter that digitizes the stimulation signal.

7. The apparatus of claim 1, further including an analog demodulator operable to demodulate the stimulation signal with respect to the divider signal prior to the stimulation signal being sampled.

8. An apparatus to indicate the proximity of a dental instrument in a tooth's root canal to the canal's apical foramen, the apparatus comprising:

a signal generator that provides a divider signal across a first node and a third node;

a reference impedance coupled between the first node and a second node;

the second node and third node being configured for electrically coupling between the dental instrument and an electrode coupled with a body tissue of the patient, a stimulation signal being defined across the second node and the third node;

a microprocessor that includes a storage, the microprocessor being operable to:

(i) sample and demodulate the stimulation signal;

(ii) compare the demodulated stimulation signal and the divider signal;

(iii) store at least one lookup table that correlates at least one comparison of the divider signal and the stimulation signal with a proximity of the dental instrument in a root canal to the apical foramen; and

(iv) generate a proximity signal from the lookup table in response to the comparison of the demodulated stimulation signal and the divider signal; and

a proximity indicator that indicates a proximity of the dental instrument to the apical foramen in response to the proximity signal.

9. The apparatus of claim 8, wherein the dental instrument includes a tip, and the proximity indication includes proximity of the tip to the apical foramen.

10. The apparatus of claim 8, wherein the dental instrument includes a dental handpiece.

11. The apparatus of claim 8, wherein the stimulation signal includes a noise generated by a handpiece driving the dental instrument.

12. The apparatus of claim 8, wherein the reference impedance essentially consists of a resistive element.

13. The apparatus of claim 8, wherein the reference impedance comprises a resistive element and a reactive element.

14. The apparatus of claim 8, further including a signal conditioner.

15. The apparatus of claim 14, wherein the signal conditioner includes a low-pass noise filter coupled between the second node and the microprocessor.

16. The apparatus of claim 14, wherein the signal conditioner includes an amplifier coupled between the second node and the microprocessor.

17. The apparatus of claim 8, wherein the demodulation of the stimulation signal includes application of at least one of a synchronous demodulation algorithm, a fast Fourier transform, a single frequency fast Fourier transform, and a convolving algorithm.

18. The apparatus of claim 8, wherein the lookup table includes an empirical element derived from observation of the divider signal and the stimulation signal as a function of proximity of the dental instrument in a root canal to the apical foramen in teeth other than teeth of the patient.

19. The apparatus of claim 8, wherein the proximity indicator includes a digital display.

20. The apparatus of claim 8, wherein the digital display displays digits representing a relative proximity to the apical foramen.

21. The apparatus of claim 8, wherein the digital display displays digits representing a distance to the apical foramen in a unit-of-measure.

22. The apparatus of claim 8, wherein the proximity indicator includes a haptic device.

23. The apparatus of claim 8, wherein the dental instrument includes a dental handpiece, and the demodulation of the stimulation signal includes demodulation of a noise in the stimulation signal generated by operation of the dental handpiece.

24. The apparatus of claim 8, wherein the microprocessor further includes an operability that automatically updates the proximity signal.

25. The apparatus of claim 8, wherein the microprocessor further includes operability that demodulates the stimulation signal while the dental instrument is moving relative to the root canal.

26. The apparatus of claim 8, wherein the divider signal consists essentially of a single frequency.

27. A method for indicating the proximity of a dental instrument in a tooth's root canal to the canal's apical foramen, the method comprising:

generating a divider signal across a first node and a third node;

impeding a current with a reference impedance coupled between the first node and a second node;

further impeding the current by electrically coupling the dental instrument in the root canal and an electrode coupled with a body tissue of the patient between the second node and third node, a stimulation signal being defined between the second node and the third node;

sampling and demodulating the stimulation signal;

digitally comparing the demodulated stimulation signal and the divider signal, and generating a proximity signal from a stored lookup table in response to the comparison, the lookup table correlating at least one comparison of the divider signal and the stimulation signal with a proximity of the dental instrument in a root canal to the apical foramen; and

indicating a proximity of the dental instrument to the apical foramen in response to the proximity signal.

28. The apparatus of claim 27, wherein the dental instrument includes a tip, and the proximity indication includes proximity of the tip to the apical foramen.

29. A method for indicating the proximity of a dental instrument in a tooth's root canal to the canal's apical foramen, the method comprising:

generating a single-frequency divider signal across a first node and a third node;

impeding current with a reference impedance coupled between the first node and a second node;

further impeding the current by electrically coupling the dental instrument in the root canal and an electrode coupled with a body tissue of the patient between the second node and third node, a stimulation signal being defined between the second node and the third node;

digitally processing the stimulation signal, the processing including:

(i) sampling and demodulating the stimulation signal;

(ii) comparing the demodulated stimulation signal and the divider signal; and

(iii) generating a proximity signal from a stored lookup table in response to the comparison of the demodulated stimulation signal and the divider signal, the lookup table correlating at least one comparison of the divider signal and the stimulation signal with a proximity of the dental instrument in a root canal to the apical foramen; and

indicating proximity of the dental instrument to the apical foramen in response to the proximity signal.

30. The apparatus of claim 29, wherein the dental instrument includes a tip, and the proximity indication includes proximity of the tip to the apical foramen.

31. The method of claim 29, including a further step of digitally processing only frequencies extending from zero up a cutoff frequency above the stimulation signal frequency.

32. The method of claim 29, including a further step of amplifying the stimulation signal before digitally processing the stimulation signal.

33. The method of claim 29, including a further step of automatically updating the proximity signal.

34. The method of claim 29, wherein demodulating includes a further step of removing noise from the stimulation voltage.

35. The method of claim 34, wherein the noise includes noise generated by a handpiece driving the dental instrument.

36. The method of claim 34, wherein the divider signal consists essentially of a single frequency.

37. An apparatus to indicate the proximity of a dental instrument in a tooth's root canal to the canal's apical foramen, the apparatus comprising:

means for generating a divider signal across a first node and a third node;

means for impeding current coupled between the first node and a second node;

the second node and third node being configured for electrically coupling the dental instrument in the root canal and an electrode coupled with a body tissue of the patient, a stimulation signal being defined between the second node and the third node;

means for digital processing that includes storage, the digital processing means being coupled to the stimulation signal and operable to:

(i) sample and demodulate the stimulation signal;

(ii) compare the demodulated stimulation signal and the signal;

(iii) store at least one lookup table that correlates at least one comparison of the divider signal and the stimulation signal with a proximity of the dental instrument in a root canal to the apical foramen; and

(iv) generate a proximity signal from the lookup table in response to the comparison of the demodulated stimulation signal and the divider signal; and

means for indicating proximity of the dental instrument to the apical foramen in response to the proximity signal.

38. The apparatus of claim 37 further including means coupled between the second node and the microprocessor that transmits frequencies extending from zero up to a cutoff frequency above the stimulation signal frequency.

39. The apparatus of claim 37, further including means for amplifying the stimulation signal coupled between the second node and the digital processing means.

40. A dental hand piece, comprising:

a dental instrument;

a dental instrument driver operable to power the instrument and mechanically coupled with the driver wherein an electrically conductive path is formed between the driver and the instrument; and

an apparatus to indicate the proximity of the dental instrument in a tooth's root canal to the canal's apical foramen, the apparatus including:

a signal generator operable to generate a divider signal;

a microprocessor operable to sense a stimulation signal derived from the divider signal and modified by a patient's impedance while the driver powers the instrument, and operable to sample and demodulate the stimulation signal from noise generated while the driver powers the instrument.

41. The apparatus of claim 40, wherein the dental instrument includes a tip, and the proximity indication includes proximity of the tip to the apical foramen.

42. The apparatus of claim 40, wherein the stimulation signal includes a noise generated by the dental instrument driver.

43. The apparatus of claim 40, wherein the divider signal consists substantially of a single frequency.

44. A method for determining the proximity of a dental instrument in a tooth's root canal to the canal's apical foramen, the method comprising:

operating a dental instrument to perform a dental/medical procedure;

sensing a stimulation signal that is a function of a patient's impedance while operating the dental instrument; and

processing the stimulation signal to indicate the proximity of the instrument to the apical foramen.

45. The method of claim 44, wherein the stimulation signal is derived from a divider signal.

46. The method of claim 44, wherein processing comprises demodulating the stimulation signal from noise generated during operation of the dental instrument.